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Geometry of the LMC Disk: Results from MACHO and 2MASS

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November 5, 2003

Astrophysical Journal

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This work was performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under Contract No. W-7405-Eng-48.

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Title: Geometryofthe LMC Disk:
Resultsfrom MACHOand
2MASS.

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Journal: AmericanAstronomical
Society,199thAASMeeting,
#54.04;Bulletinofthe
AmericanAstronomical
Society,Vol.33,p.1382

PublicationDate: 12/2001

Origin: AAS

AbstractCopyright: (c)2001:American
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BibliographicCode: 2001AAS...199.5404N

Abstract

Wehavecross-correlatedMACHOLMCCepheidswith2MASSSecondIncrementalRelease Catalog. TheresultingdatabaseisconsiderablylargerthanthesetofOGLECepheidsinthe LMCbar,andhassignificantlybetterarealcoverage,allowingmoreaccuratedeterminationof LMCgeometry. Random-phasecorrectionisappliedto2MASSJ,H,andK_smagnitudes,using theknowledgeofV-bandlightcurveandtheephemerisof2MASSobservations,toproduce meanmagnitudes. Theimprovementofphase-correctedPLrelationsoverrandom-phasePL relationsisclearlydemonstrated. Reddeningisestimatedforeachstarindividually,further

improving the accuracy of the method. The orientation parameters of the LMC are derived by a Maximum Likelihood approach which solves for viewing angles and PL coefficients simultaneously, providing an unbiased estimation. The results of the analysis are used to place limits on warping of the LMC disk. Implications for the microlensing optical depth are also discussed.

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